SGMA and Sustainable Management Criteria

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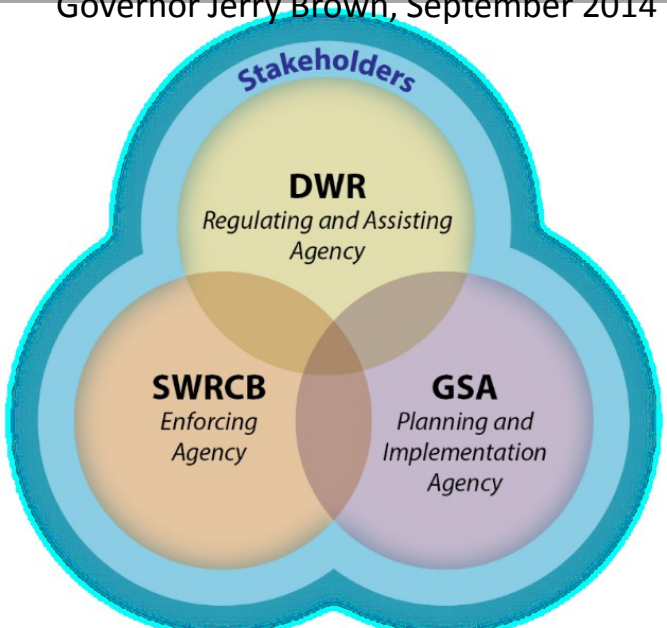
May 4, 2018
Sustainable Water Resources Roundtable

SGMA Overview

Local Control

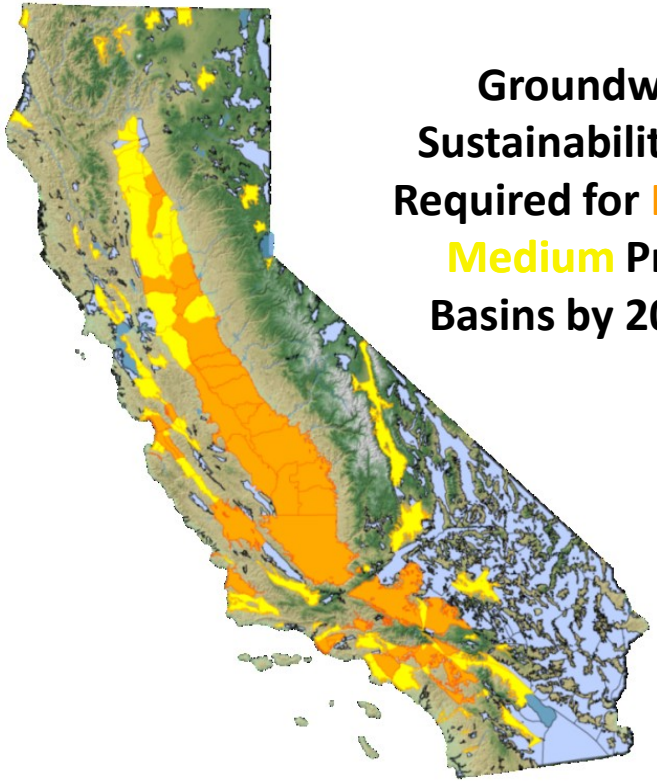
"A central feature of these bills is the recognition that groundwater management in California is best accomplished locally."

Governor Jerry Brown, September 2014



Sustainability

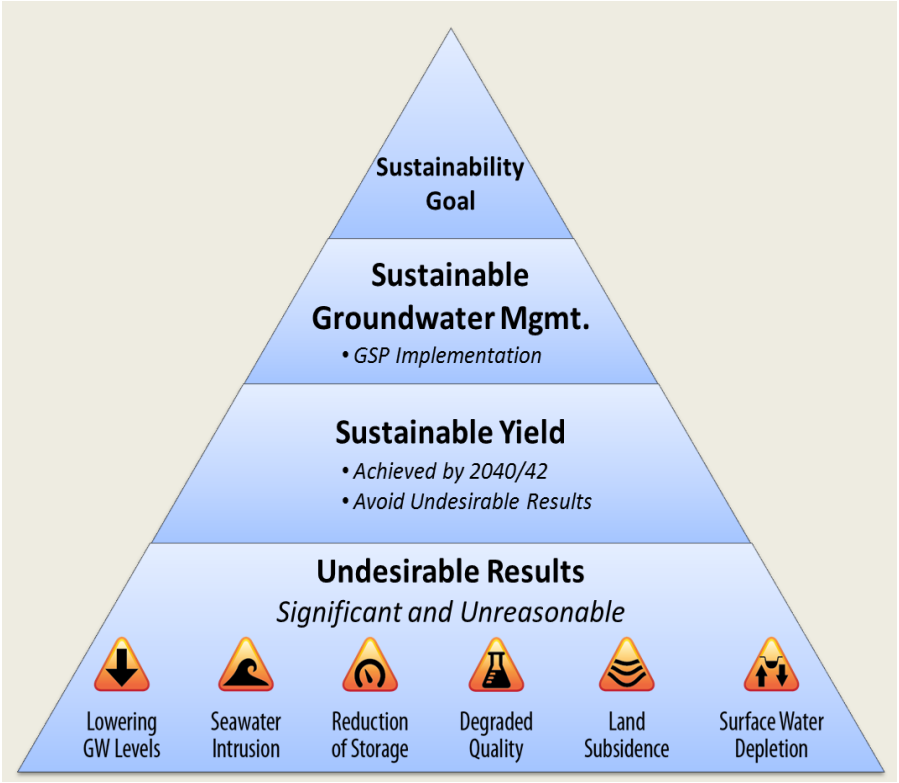
Avoid Six Undesirable Results



Groundwater Sustainability Plans Required for High and Medium Priority Basins by 2020/22

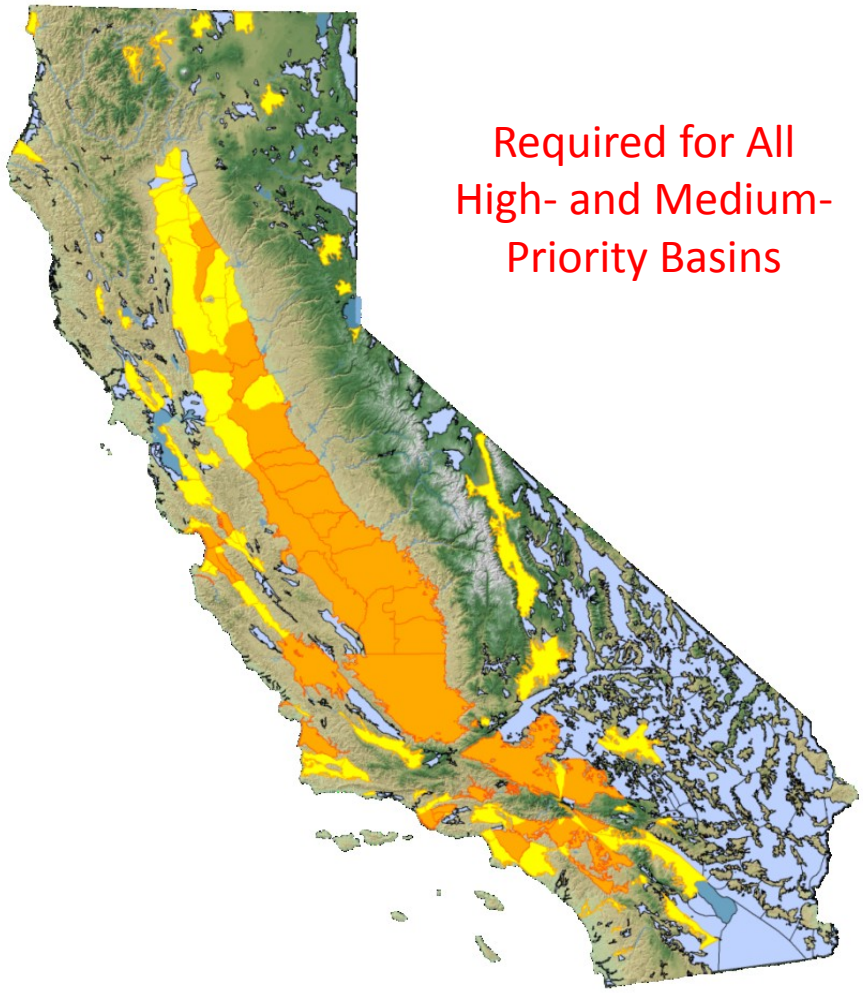
Undesirable Results and Sustainability Indicators

- Chronic **lowering of groundwater levels** indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon….
- Significant and unreasonable **reduction of groundwater storage**
- Significant and unreasonable **seawater intrusion**
- Significant and unreasonable **degraded water quality**, including the migration of contaminant plumes that impair water supplies
- Significant and unreasonable **land subsidence** that substantially interferes with surface land uses
- **Depletions of interconnected surface water** that have significant and unreasonable adverse impacts on beneficial uses of the surface water



GSP Regulation Articles

1. Introductory Provisions
2. Definitions
3. Technical and Reporting Standards
4. Procedures
5. Plan Contents
6. Department Evaluation and Assessment
7. Annual Reports and Periodic Evaluations by the Agency
8. Interagency Agreements
9. Alternatives



Required for All High- and Medium-Priority Basins

Article 5. Plan Contents

- **1. Administrative Information**
  - §354.4. General Information
  - §354.6. Agency Information
  - §354.8. Description of Plan Area
  - §354.10. Notice & Communication
- **2. Basin Setting**
  - §354.14. Hydrogeologic Conceptual Model
  - §354.16. Groundwater Conditions
  - §354.18. Water Budget
  - §354.20. Management Areas
- **3. Sustainable Management Criteria**
  - §354.24. Sustainability Goal
  - §354.26. Undesirable Results
  - §354.28. Minimum Thresholds
  - §354.30. Measurable Objectives
- **4. Monitoring Networks**
  - §354.34. Monitoring Network
  - §354.36. Representative Monitoring
  - §354.38. Assessment & Improvement
  - §354.40. Reporting Monitoring Data to the Department
- **5. Projects and Management Actions**
  - §354.44. Projects & Management Actions

Article 5: Plan Contents

Subarticle 1:

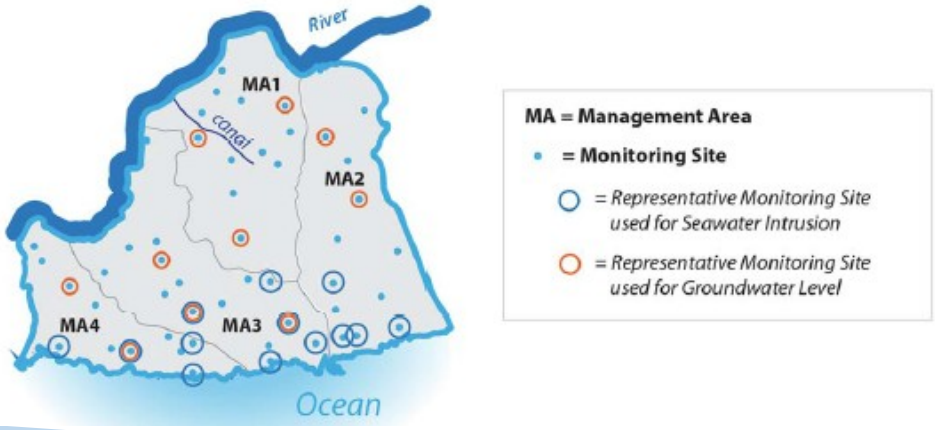
Administrative Information

- General Information
- Agency (GSA) Information
- Description of Plan Area
  - Maps
  - Written descriptions
  - Description of land use elements
- Notice and Communication
  - Description of beneficial uses and users of groundwater
  - List of public meetings
  - A communications section

Subarticle 2:

Basin Setting

- Hydrogeological Conceptual Model
- Groundwater Conditions
- Water Budget
- Management Areas



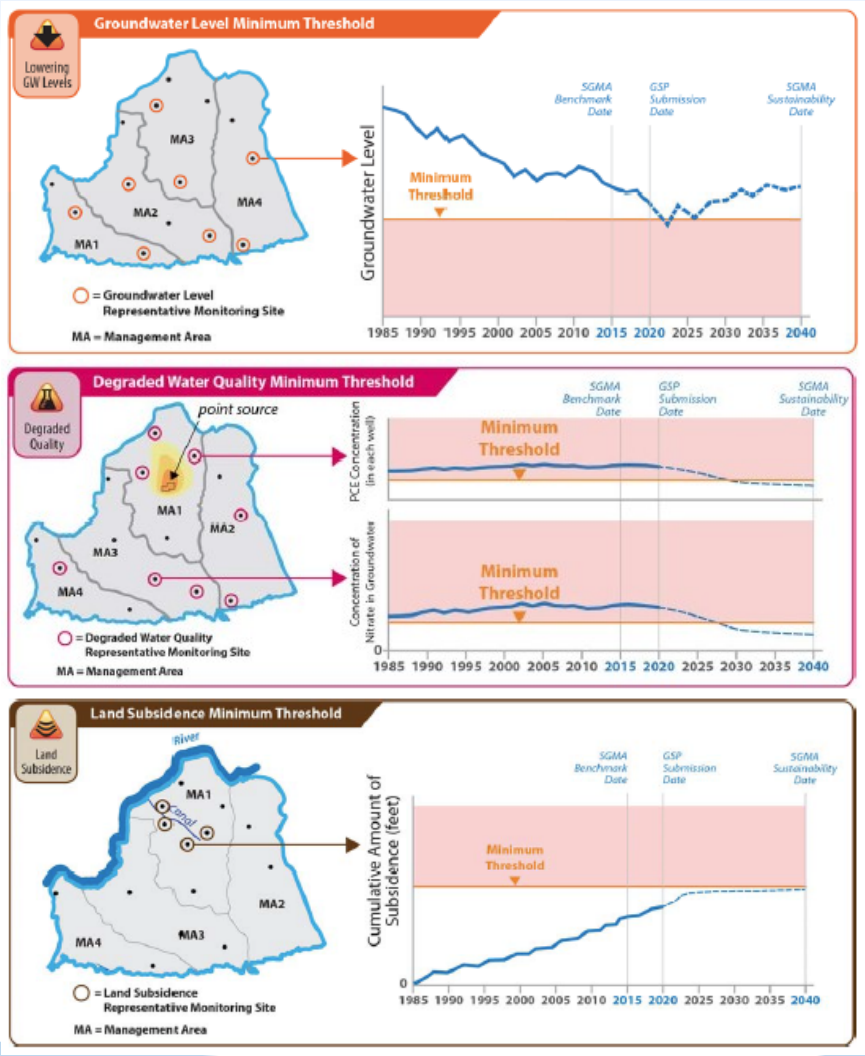
Article 5: Plan Contents

Subarticle 3:

Sustainable Management Criteria

- Sustainability Goal
- Undesirable Results
- Minimum Thresholds
- Measurable Objectives
  - Interim Milestones

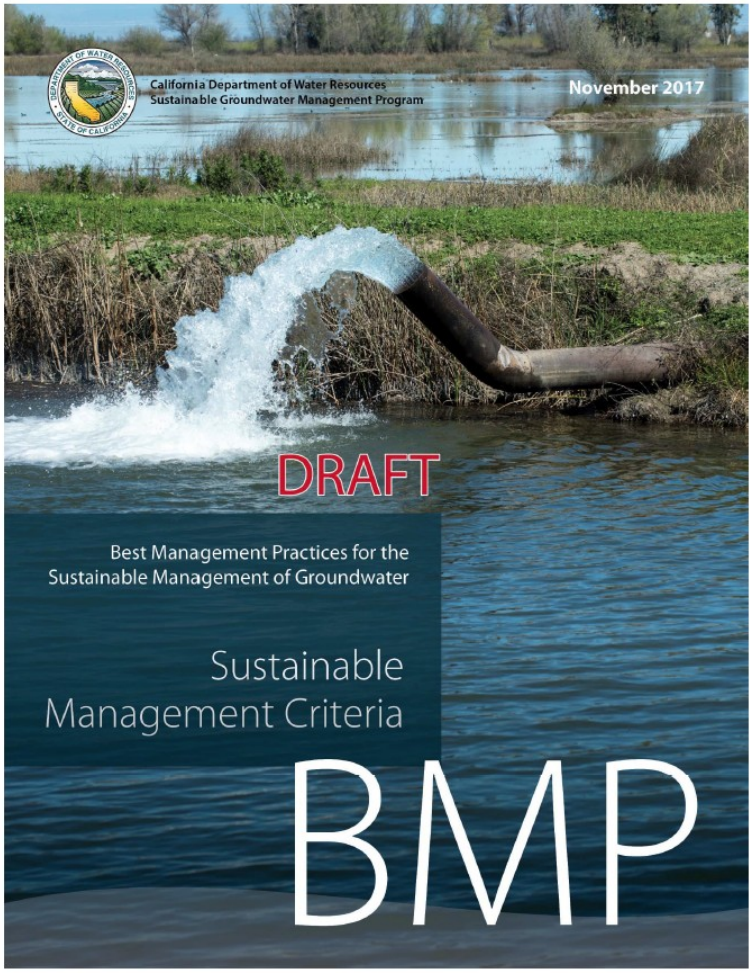
Sustainability Indicators	Lowering GW Levels	Reduction of Storage	Seawater Intrusion	Degraded Quality	Land Subsidence	Surface Water Depletion
Metric(s) Defined in GSP Regulations	• Groundwater Elevation	• Total Volume	• Chloride concentration isocontour	• Migration of Plumes • Number of supply wells • Volume • Location of isocontour	• Rate and Extent of Land Subsidence	• Volume or rate of surface water depletion



Sustainable Management Criteria BMP
Defining Sustainability

- SMC are the required, quantitative metrics that define sustainable management of a basin
- SMC are determined locally
- SMC support an outcome-driven process to achieving sustainability

- Sustainable Management Criteria
  - Sustainability Goal
  - Undesirable Results
  - Minimum Thresholds
  - Measurable Objectives
    - Interim Milestones

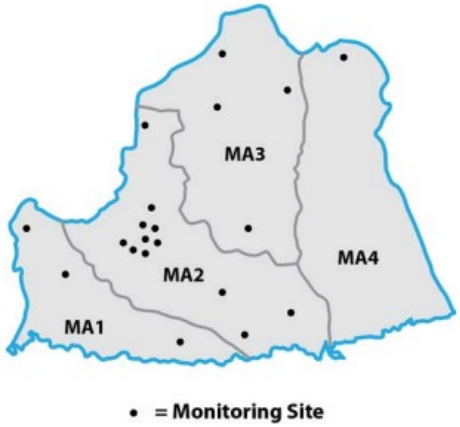


Article 5: Plan Contents

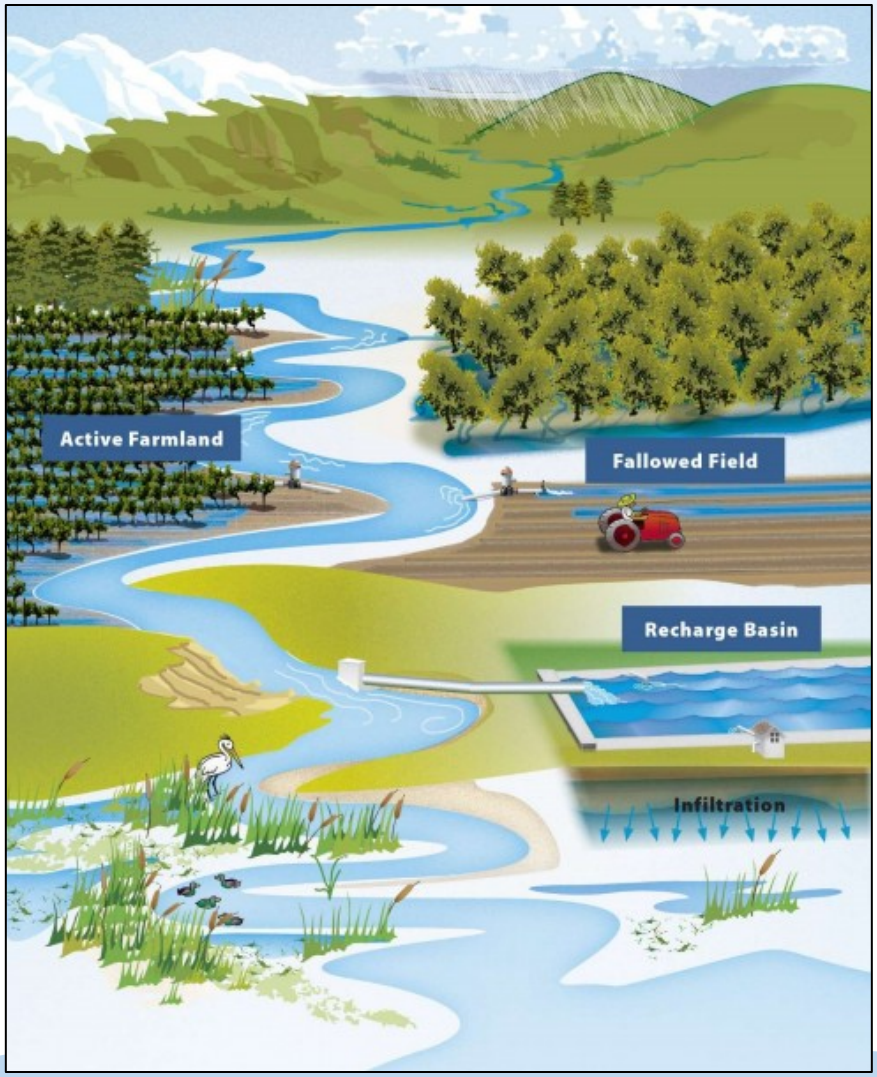
Subarticle 4:

Monitoring Networks

- Monitoring networks must include:
  - Monitoring objectives.
  - Monitoring protocols.
  - Data reporting requirements.
- Must promote the collection of data of sufficient quantity, frequency, and distribution to characterize groundwater and related surface water conditions.
- Monitoring network must be able to evaluate changing conditions in the basin.



Article 5: Plan Contents



Subarticle 5:

Projects and Management Actions

- Realistic and sufficient projects and actions to achieve sustainability.
- Developed to a level that demonstrates GSAs have the resources, knowledge, and stakeholder acceptance to implement them.
- Known timeframe and general cost.
- Projects do not need to be designed.
- Supplemental plans and actions to address future uncertainties.
- All projects and management actions do NOT have to be implemented just because they are listed in the GSP.

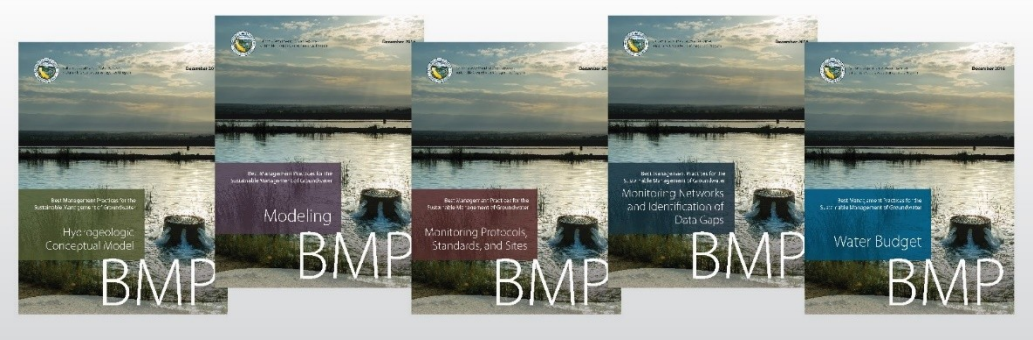
Existing BMPs and Guidance Documents

BMPs (Dec. 2016)

1. Monitoring Protocols, Standards, and Sites
2. Monitoring Networks and Identification of Data Gaps
3. Hydrogeologic Conceptual Model
4. Water Budget
5. Modeling

Guidance Documents

- Preparation Checklist (Dec. 2016)
- GSP Annotated Outline (Dec. 2016)
- Engagement with Tribal Governments (Draft June 2016)
- Stakeholder Communication and Engagement (February 2018)



Resources

DWR SGMA landing page

https://www.water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/

Best Management Practices and Guidance Documents

https://www.water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents

Data and Tools

https://www.water.ca.gov/Programs/Groundwater-Management/Data-and-Tools

Backup Slides

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Undesirable Result

- Occurs when any of the six sustainability indicators become *significant and unreasonable*, as defined locally
- Based on a combination of minimum threshold exceedances
- Must be eliminated within 20 years of GSP implementation
  - Some basins will experience undesirable results within the implementation period
- Must be coordinated for the entire basin

Sustainability Goal

- A goal that culminates in the absence of undesirable results within 20 years of GSP implementation
- Description of goal includes
  - Information from basin setting used to establish the goal
  - Discussion of measures that will be implemented
  - Explanation of how the goal will be achieved within 20 years of GSP implementation and is likely to be maintained through the planning and implementation horizon (50 years)

Undesirable Results and Sustainability Indicators

- Chronic **lowering of groundwater levels** indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon….
- Significant and unreasonable **reduction of groundwater storage**
- Significant and unreasonable **seawater intrusion**
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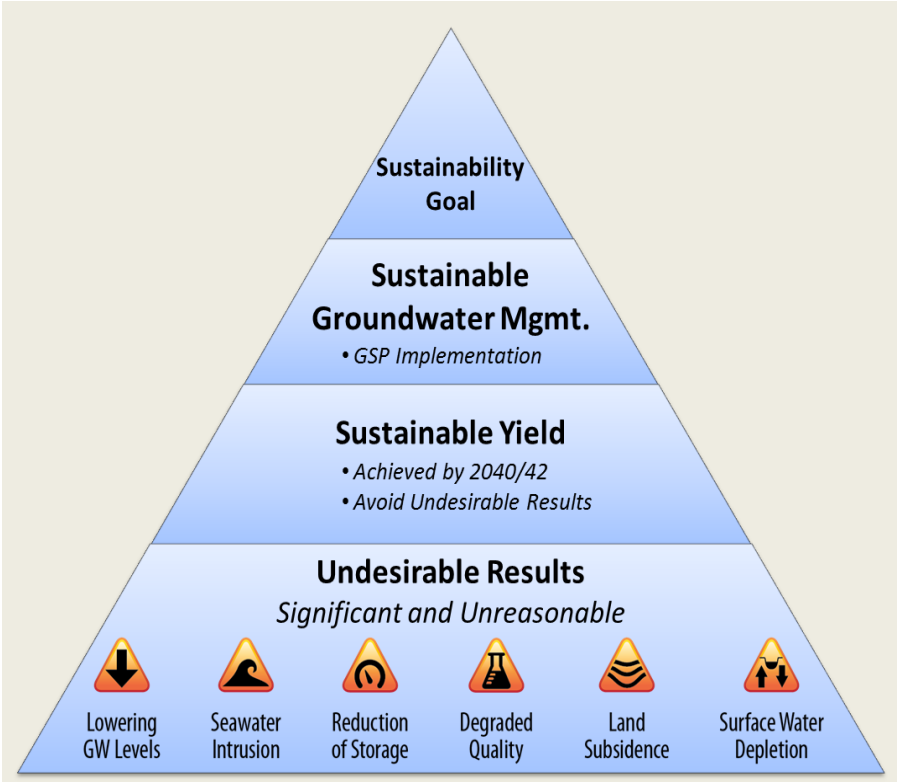
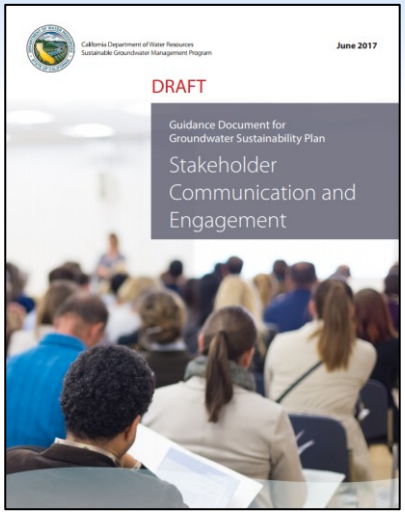
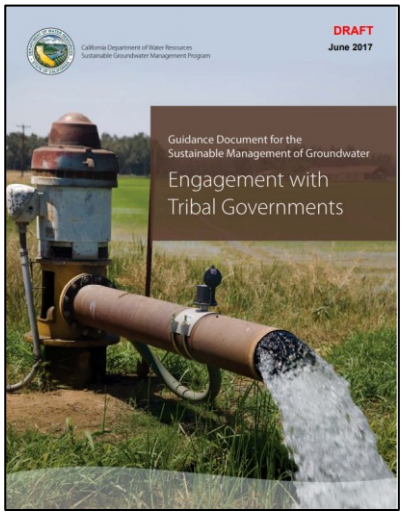
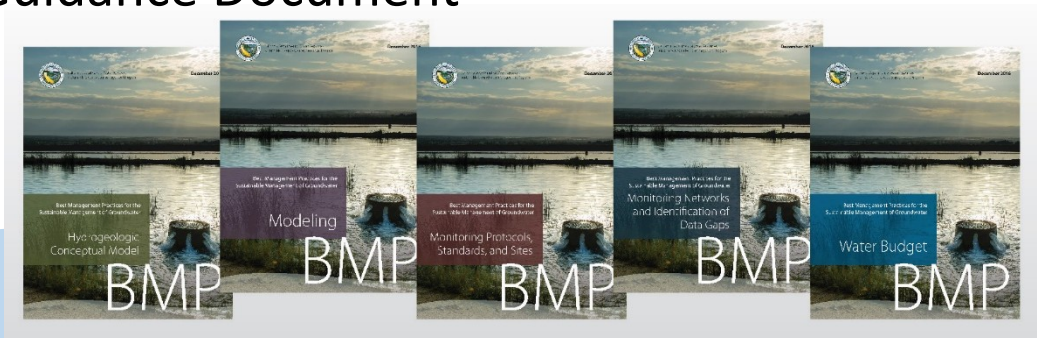


Preliminary Activities

- Understand the Basin Setting
  - Hydrogeologic Conceptual Model BMP
  - Modeling BMP
  - Water Budget BMP
- Inventory Existing Monitoring Programs
  - Monitoring Protocols, Standards, and Sites BMP
  - Monitoring Networks and Identification of Data Gaps BMP
- Engage Interested Parties in the Basin
  - Engagement with Tribal Governments Guidance Document
  - Stakeholder Communication & Engagement Guidance Document







Assess Sustainability Indicators

- Start by assessing all six *sustainability indicators*
  - Default position should be that all six apply
  - Individual sustainability indicators can be removed from consideration only after demonstrating that they do not exist and are not likely to occur
- For each indicator, consider the conditions that would represent *significant and unreasonable*
  - Local decision based on local conditions and concerns
  - Later, these will be translated into quantitative undesirable results
- Consider the use of *management areas* (optional)
- Develop initial *representative monitoring sites*
  - A subset of all monitoring sites in a basin where minimum thresholds and measurable objectives will be set

Minimum Threshold

- Quantitative value representing conditions at a monitoring site that, when exceeded individually or in combination with other minimum thresholds, may cause an undesirable result in the basin
- Set for each representative monitoring site

Sustainability Indicators	Lowering GW Levels	Reduction of Storage	Seawater Intrusion	Degraded Quality	Land Subsidence	Surface Water Depletion
Metric(s) Defined in GSP Regulations	• Groundwater Elevation	• Total Volume	• Chloride concentration isocontour	• Migration of Plumes • Number of supply wells • Volume • Location of isocontour	• Rate and Extent of Land Subsidence	• Volume or rate of surface water depletion

Minimum Thresholds

Each minimum threshold must be supported by documentation of:

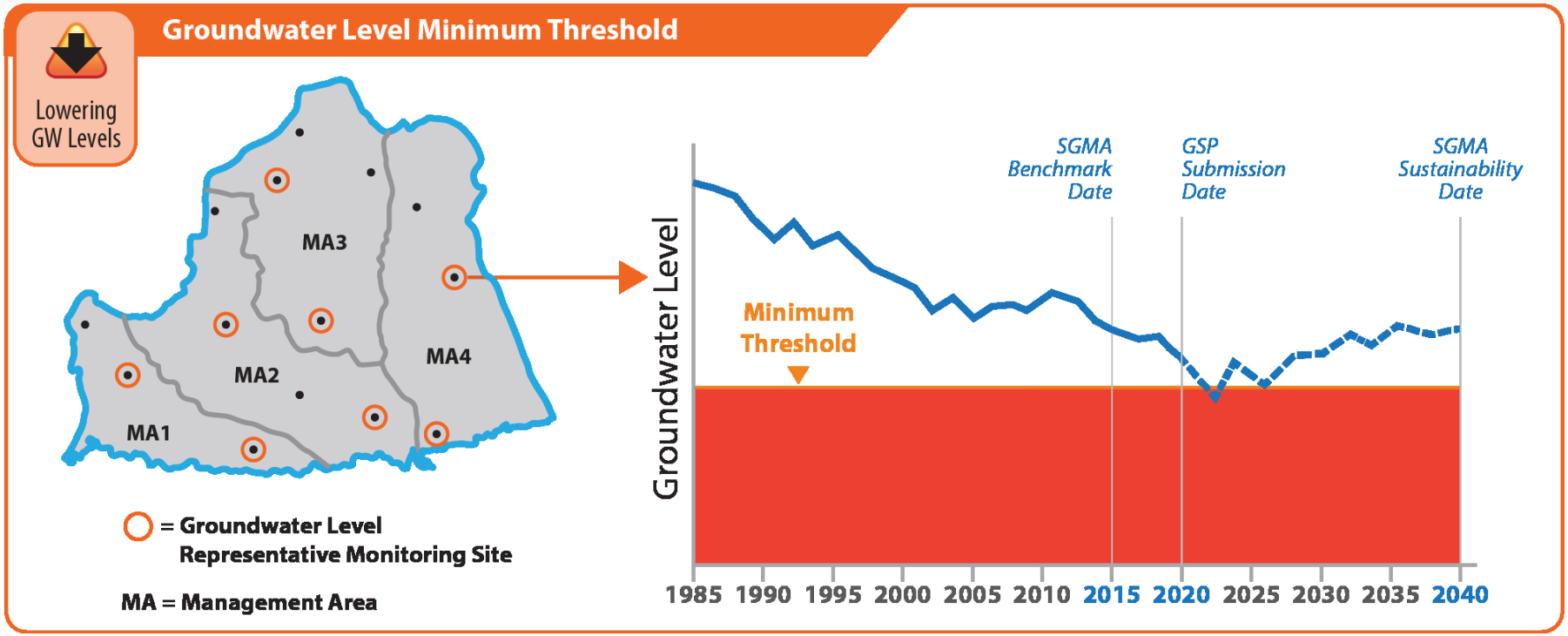
1. *The information and criteria relied upon to establish and justify the minimum thresholds for each sustainability indicator. The justification for the minimum threshold shall be supported by information provided in the basin setting, and other data or models as appropriate, and qualified by uncertainty in the understanding of the basin setting.*
2. *The relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators.*
3. *How minimum thresholds have been selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.*
4. *How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.*
5. *How state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the Agency shall explain the nature of and basis for the difference.*
6. *How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.*

Minimum Thresholds

Each minimum threshold must be supported by documentation:

1. information and criteria
2. relationship between the minimum thresholds for each sustainability indicator
3. avoid causing undesirable results in adjacent basins
4. Affects to the interests of beneficial uses and users of groundwater or land uses and property interests.
5. state, federal, or local standards
6. quantitatively measured, consistent with the monitoring network requirements

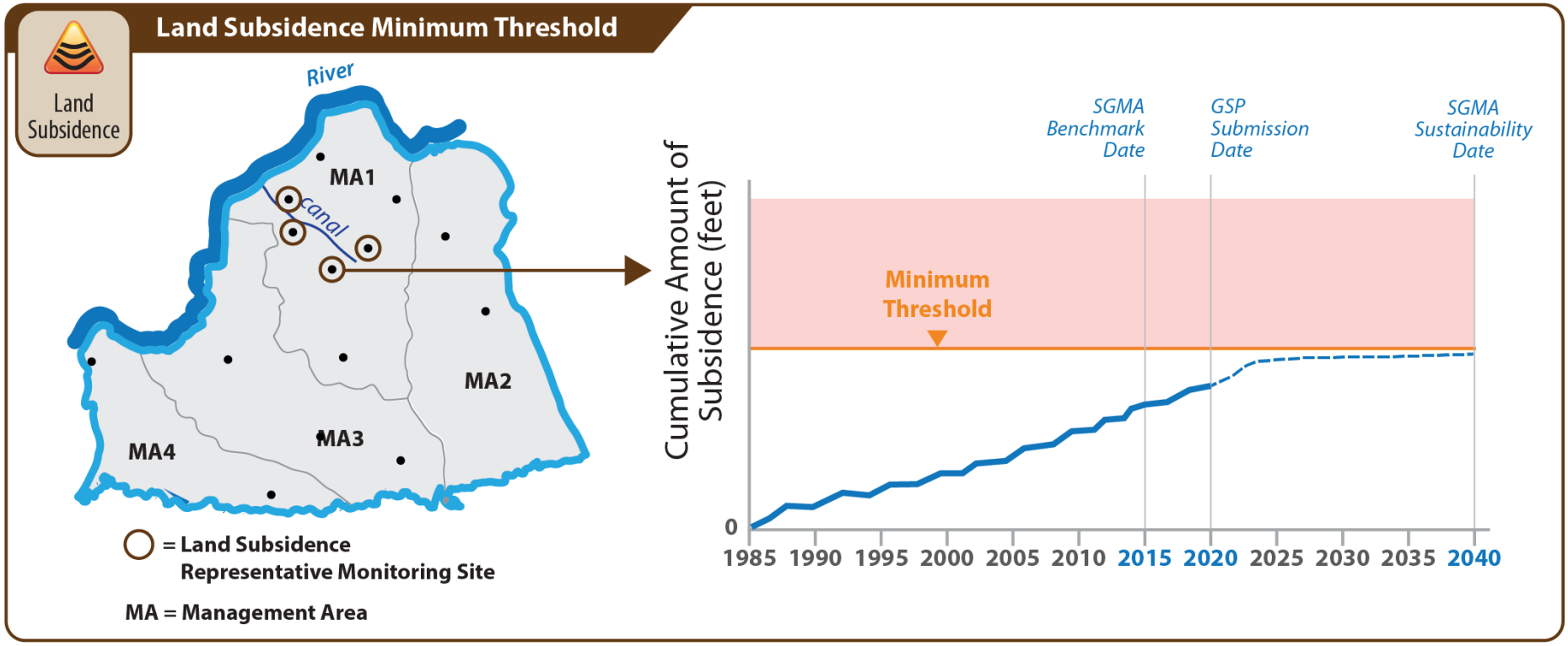
Minimum Threshold – Declining Groundwater Levels



Lowering of Groundwater Levels

- What are the:
  - historical groundwater conditions in the basin?
  - average, minimum, and maximum depths of municipal, agricultural, and domestic wells?
  - screen intervals of the wells?
  - adjacent basin's minimum thresholds for groundwater elevations
  - potential impacts of changing groundwater levels on groundwater dependent ecosystems?
- What impacts do water levels have on pumping costs (e.g., energy cost to lift water)?
- Which principal aquifer, or aquifers, is the representative monitoring site evaluating?

Minimum Threshold - Land Subsidence

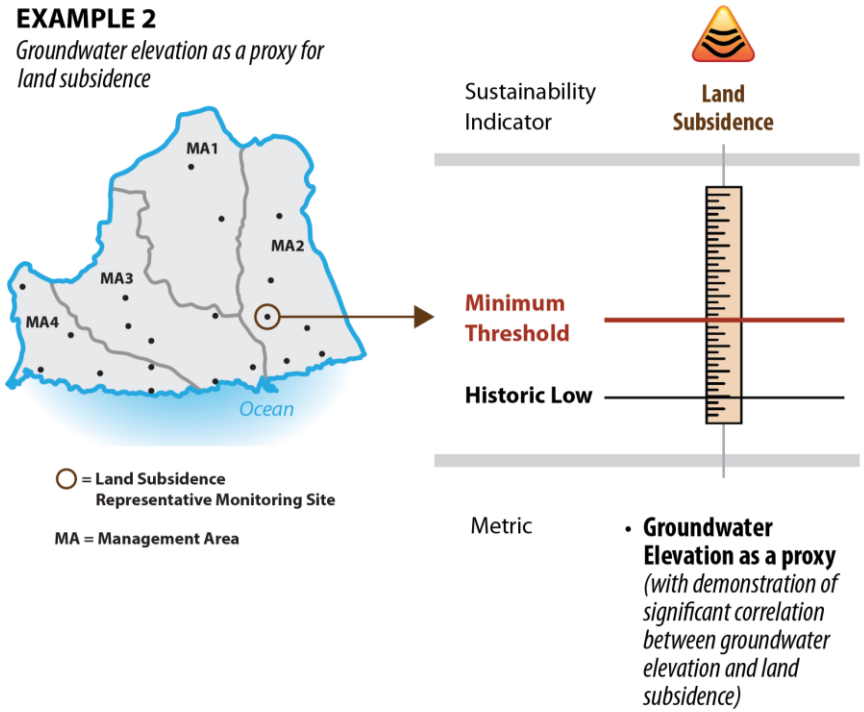


Land Subsidence

- Do principle aquifers in the basin contain aquifer material susceptible to subsidence?
- What are the historical, current, and projected groundwater levels, particularly the historical lows?
- What is the historical rate and extent of subsidence?
- What are the land uses and property interests in areas susceptible to subsidence?
- What is the location of infrastructure and facilities susceptible to subsidence (e.g., canals, levees, pipelines, major transportation corridors)?
- What are the adjacent basin's minimum thresholds?

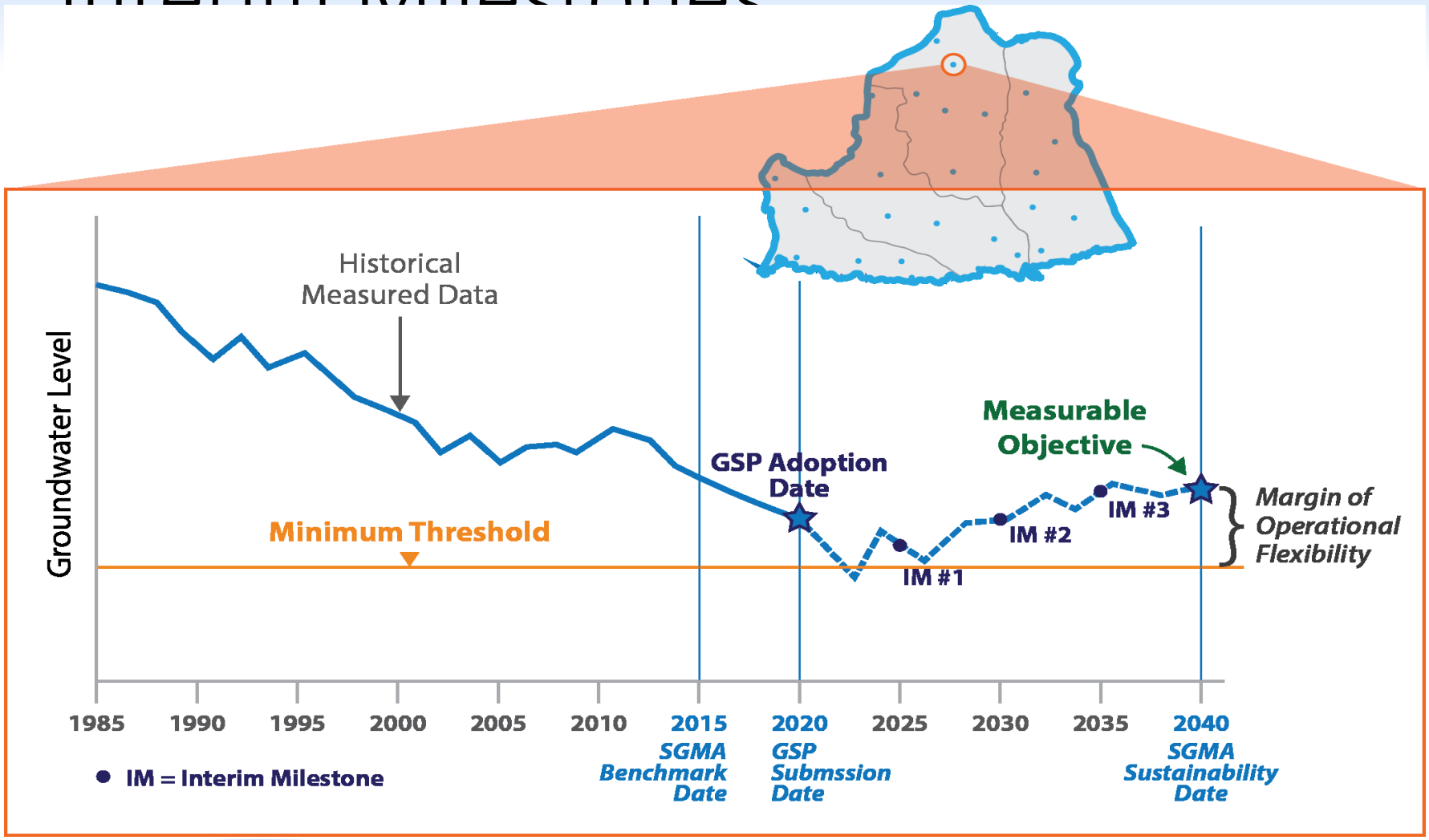
Groundwater Elevations as a Proxy

- Groundwater elevation can be used as a proxy metric for any sustainability indicator
- GSP must demonstrate significant correlation between groundwater elevation and the other metric



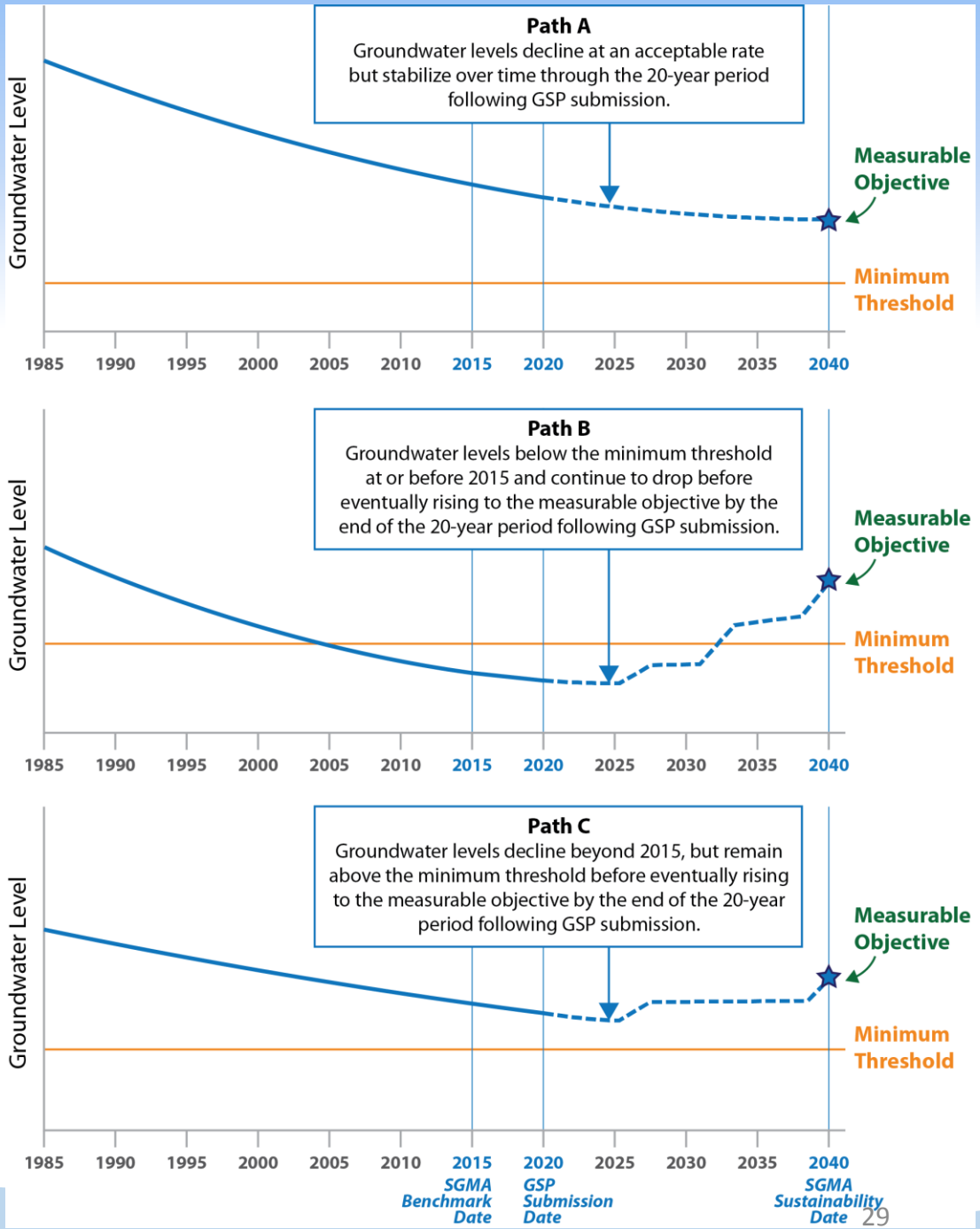
Note: This example uses groundwater elevation as a proxy metric for the land subsidence sustainability indicator, but groundwater elevation can be used as a proxy for other sustainability indicators.

Measurable Objectives and Interim Milestones



Paths to Sustainability

- Defined locally
- Will vary based on local conditions and values



Conclusions

- SMC are the required, quantitative metrics that define sustainable management of a basin
- SMC are determined locally
- SMC support an outcome-driven process to achieving sustainability
- DWR staff (headquarters staff, regional coordinators, POCs)